

We claim:

1. A method of authenticating a media signal comprising:
transforming at least a portion of the media signal into a set of frequency
coefficients in a frequency domain;
5 adjusting a relationship between selected frequency coefficients to a reference
value such that an alteration to the media signal to be detected alters the relationship.
2. The method of claim 1 wherein the media signal is an image signal.
- 10 3. The method of claim 2 wherein the alteration to be detected is scanning,
printing or photocopying the image signal.
4. The method of claim 1 wherein the relationship comprises a ratio between a
selected coefficient and one or more neighboring coefficients.
- 15 5. The method of claim 4 wherein the relationship comprises a ratio between the
magnitude of a selected coefficient and an average of neighboring coefficients.
6. The method of claim 1 including:
20 embedding a calibration signal into the media signal to enable a detector to
compensate for changes in scale or translation of the media signal after being adjusted
according to the relationship.
7. A computer readable medium on which is stored software for performing the
25 method of claim 1.
8. A detector for authenticating a media signal that has been processed according
to the method of claim 1.

16. The method of claim 10 wherein the media signal is a video signal.

17. A computer readable medium having software for performing the method of claim 10.

18. A watermark decoder comprising:

5 a detector for correlating a calibration signal with a media signal suspected of carrying a watermark to determine orientation parameters describing orientation of the media signal at embedding of the watermark, where the calibration signal includes a set of peaks at selected frequency coefficients; and

10 an analyzer operable to orient the media signal using the orientation parameters and to evaluate whether the media signal has been altered after the embedding by examining signal peaks at selected frequency coefficients in the media signal.

15 19. The decoder of claim 18 wherein the detector and analyzer use at least some of the same frequency coefficients for determining orientation and evaluating whether the media signal has been altered.

20 20. The decoder of claim 18 wherein the analyzer is used to detect reproduction of a printed image by examining degradation of the media signal at selected frequency coefficients.

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